Invertebrata

Tasmania's Invertebrate Newsletter

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Invertebrata is produced by the Queen Victoria Museum and Art Gallery, Launceston, Tasmania.

We publish articles and short notes on all aspects of invertebrate biology and conservation in Tasmania.

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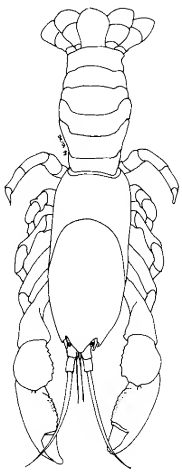
Ever-changing names – or, why ecologists hate taxonomists!

Brita Hansen

Parastacoides are small, burrowing crayfish. The scientific name may be well known to bushwalkers in this State, as many a sprained ankle has resulted from burrows giving way underfoot on walks through buttongrass plains in the Southwest! During a recent review of the genus (by myself and my PhD supervisor at the School of Zoology, Alastair Richardson), an intriguing tale of loss and misunderstanding has come to light which has may lead, unfortunately, to our having to change the generic name of this crayfish.

The original description, along with that of several other Australian crayfish species, was given by W.F. Erichson in 1846. His description was based on one female specimen from 'Van Diemens Land', collected sometime between 1839 and 1842 by Adolphus Schayer, who was then superintendent of the Woolnorth property of the Van Diemens Land Company, in far northwest Tasmania. This specimen was deposited in the collection of the Berlin Museum.

Ellen Clark undertook an extensive review of all Australian freshwater crayfish in 1936. She raised Erichson's species to genus level, naming it *Parastacoides*. Clark noted that, from previous literature, one of the type specimens examined by Erichson was missing from the Berlin Museum, although she did not examine any of the original material herself. She also suggested that Erichson appeared to have assigned a character to the wrong specimen, and that if one swapped this character with that of another specimen, the descriptions of both made sense. Unfortunately, the other specimen in the character-swapping pair was the missing specimen.



Therein lies the rub! All reviewers after Clark have interpreted her words as meaning that one swaps the specimens, not just the character. This led them to believe the original *Parastacoides* specimen was the one lost from the Berlin Museum. Fortunately (or unfortunately if you like), when we started our review Alastair requested the original specimen of *Parastacoides* to be sent from the Berlin Museum. You may be thinking that this would have solved all the problems of assigning names correctly, but no! When the specimen arrived it turned out to be not one of *Parastacoides*, but one of what is now known as *Geocharax*.

You'll recall that the original was collected by the superintendent of 'Woolnorth'. *Parastacoides* is not found in that area, and it is highly unlikely that Schayer, in 1839-1842, could have been collecting in any area where *Parastacoides* occurs. *Geocharax*, on the other hand, is restricted in Tasmania to the far Northwest.

(continued on p. 2)

Editorial

Last issue I mused about which Tasmanian invertebrate would suffer the least inconvenience from loss of a limb. The Tasmanian Marine Naturalist Association is promoting seastars. 'If a seastar tube foot fits the definition', writes Jane Elek of TMNA, 'they have countless hundreds of them and seem to manage with dozens of them ripped off and presumably replace them. If a seastar arm fits the definition, then they not only manage without one or four, but can even grow a new one or four. If part of the central disc is attached to the dismembered arm, it can grow a whole new animal - a cloning feat we "higher" animals are still waiting for our medical colleagues to perfect.'

* * *

Brisbane's BOIC (see item on this page) is an inspiration. Wouldn't it be nice to have an identification CD or tape of Tasmanian insect songs? Bird audios are readily available, and Central North Field Naturalists (formerly Deloraine Field Naturalist Group) have produced an excellent frog ID tape. Who'll have a go at recording our smaller singers?

DPIWE's *Catalogue of the Insects of Tasmania* lists eight cicada species for the State. There are perhaps 30 singing Tasmanian Orthoptera, although you might dispute 'singing' when applied to mole crickets, *Gryllotalpa*. Then there's the 'whistling' noctuid moth *Hecatesia fenestrata*. *Tasmanian Insect Songs* would probably have fewer than 40 tracks.

My wife and I would like to pre-order a copy of the audio from anyone game enough to compile it. There's a common Northwest insect we call the 'Zit Zit' from the noise it makes in the evening, and after years of having 'Zit Zits' for neighbours, we're keen to put a name to the sound.

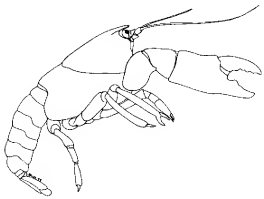
* * *

Snail biogeographer Kevin Bonham found the rock of his dreams recently on Macgregor Peak (Forestier Peninsula). The 'medium-sized' rock yielded 13 specimens of a rare new species and nine of another species whose range was thereby extended by 65 km. Neither snail turned up anywhere else on the trip in four hours of searching. The technical term for this is 'jackpot distribution', or in lay terms, 'sheer bloody luck'.

(continued from p. 1)

We are pursuing all possible options to avoid changing the name of *Parastacoides*, and we will let *Invertebrata* readers know what the name for this crayfish will be when it becomes officially recognised.

I would like to say a few words here on why getting scientific names right is so important. Our review will lead not only (possibly) to a change of generic name, but also to a change in the number of recognised species. The genus will increase from one species (with three named subspecies) to 14 species. This has enormous implications for conservation. The three sub-species were quite well protected by the inclusion in the World Heritage Area of most of each of their ranges. However, some of the distributions of the newly proposed species lie totally outside the WHA, and these species are not protected. These species are unfortunately those with the smallest distributions and population sizes. It is vital that we know which species we are talking about; they're not all just 'yabbies'. So… please don't hate taxonomists when well-known animals change their names suddenly!



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Hansen, B. & Richardson, A.M.M. 1999. Interpreting the geographic range, habitat and evolution of the Tasmanian freshwater crayfish genus *Parastacoides* from a museum collection. *In*: Ponder, W. & Lunney, D., eds. *The Other 99%. The Conservation and Biodiversity of Invertebrates*. Mosman (NSW): Royal Zoological Society of New South Wales.

Heard of BOIC?

Invertebrata has begun a newsletter exchange with the Butterfly and Other Invertebrates Club Inc. in Brisbane. BOIC was formed several years ago by Helen Schwencke and Frank Jordan, and has an active and enthusiastic membership. The organisation has seven aims:

- To establish a network of people growing butterfly host plants;
- To hold information meetings about invertebrates;
- To organise excursions around the theme of invertebrates, e.g. butterflies, fireflies, ants, dragonflies, beetles, freshwater habitats, and others;
- To promote conservation of the invertebrate habitat;
- To promote the keeping of invertebrates as alternative pets;
- To promote research into invertebrates;
- To encourage the construction of invertebrate-friendly habitats in urban areas.

The BOIC newsletter is well-written, well-illustrated and informative. The June issue (No. 13) includes a report on a 'Cicada Run' undertaken by Rob Macsloy and Lindsay Popple last January. The aim was to record as many cicadas as possible in a single day by recognising their songs. After 14 hours and 400 km on the road, the intrepid BOICers had recorded 23 named cicadas. Another six cicada songs were heard but could not be assigned to known species.

BOIC maintains a register of butterfly host plants. If a member is raising caterpillars and the food supply for the species in question is running low, the register can be used to find prospective 'foster parents' who are growing the requisite host plant!

For more information about BOIC, write directly to the club at PO Box 2041, Runcorn QLD 4113, or by email: **hschwenc@dovenetq.net.au**.

Seafood cheques and balances

Tasmania's best-paid invertebrate collectors work in the marine wild fishery. What and where they collect is regulated by the State Government, which decides quotas on a mix of science (population biology studies) and catch results. When stocks look threatened, fisheries are temporarily closed. This article, compiled from a variety of sources, looks at the background to some recent closures.

Scallops

The Tasmanian scallop fishery was closed from 13 October following reports of reduced catches. Industry sources blamed Victorian and local fishers who had been exceeding their catch quotas and fishing closed beds of juveniles.

The commercial scallop Pecten fumatus *is mainly harvested from beds around the Bass Strait islands and the northeast coast. Catches peaked in 1983-84 with 12 311 tonnes landed. The fishery crashed shortly after and was closed in 1987 to allow stocks to recover. Scallop harvesting resumed for limited seasons in 1995, 1996, 1998 and 1999. Most of the catch is taken by rock lobster fishermen who are also licensed to fish for scallops. About two-thirds of the Tasmanian scallop harvest is processed in Victoria. Fresh scallops are sold locally and in Melbourne and Sydney fish markets, while frozen scallops are exported, mainly to France. In 1995, the local production of 198 tonnes (shelled meat) earned Tasmanian fishers more than $2.5 million.*

Abalone

The greenlip abalone fishery off eastern Tasmania was closed on 8 October. The annual catch limit had been reached with three months remaining in the legal season. At the beginning of October, the State Government was warning that divers had nearly taken the annual catch limit off western Tasmania as well. The greenlip fishery in the Furneaux Group had already been closed.

'Greenlip abalone', Haliotis laevigata, *comprises about 5% of the Tasmanian abalone catch, the remainder being the smaller 'blacklip abalone',* Haliotis rubra. *Tasmania produces about one-quarter of the world's wild-caught abalone with a total annual harvest of roughly 2100 tonnes, valued at about $60 million. A complex arrangement of quota and catch controls applies to the commercial fishery. Several thousand recreational abalone licences are also issued each year, with amateur divers allowed to take 10 abalone per day. On average, commercial abalone divers take 60 kg of abalone per hour when diving 5 hours per day on 80 days per year. The commercial catch is frozen, cooked or shipped live. About 95% of the commercial catch goes to Japan, Taiwan and Hong Kong.*

Crab

The giant crab fishery in Tasmanian waters will re-open on 13 November after a 17-month closure.

The Southern giant crab, Pseudocarcinus gigas, *is the world's heaviest crab (to 14 kg). A southern Australian fishery targeted at this species began in 1992. Separate harvest zones are controlled by the Western Australian, South Australian, Victorian and Tasmanian Governments. The total catch this year is expected to be about 240 tonnes, of which Tasmanian waters will account for about 100 tonnes (total allowable catch for the Tasmanian zone). The Tasmanian catch in 1997-98 was 112 tonnes. In June 1998 the Tasmanian fishery was closed pending the development of a management strategy. Total allowable catch levels for each of the four zones are 'first guesses' and yields will be monitored by the relevant State agencies. Catches have earned fishers up to $3 million per season.*

Squid

Taking of calamary squid in Great Oyster Bay on the East Coast has been banned from 25 October to 7 November and from 22 November to 5 December. Each Spring large numbers of Southern Calamary, *Sepioteuthis australis,* come inshore to spawn in the Bay. Apparent population increases in recent years have led to greatly increased fishing effort, and the temporary closure of the fishery is designed to ease the pressure on local breeding stocks of Southern Calamary.

Museum news

QVMAG

Tammy Gordon has now left on maternity leave (the main event is mid-November) and Craig Reid has been appointed as temporary replacement. Fortunately he will have some assistance with his biggest task as we come into the 'spider season' with public enquiries on spiders starting to climb. Visiting arachnologist Lisa Joy Boutin has been awarded a Plomely Foundation grant to continue her work on the QVMAG spider collection. She will be here initially for three months but we are hoping to find ways of keeping her longer. There is certainly a lot of work for her to do, but finding the money (as always) is the problem.

My tenure as Acting Curator is rapidly coming to an end, though exactly what is going to happen early next year has still not been finalized. Some progress has been made on organising the large collections from the Monitoring River Health Initiative and the Inland Fisheries Commission but there is still a way to go. We have held a couple of Saturday Work-Days to get interested volunteers in to do some of the routine rehousing of the collections, but now that the weather has warmed up, few people want to sit inside on weekends transfering microscopic insect larvae from one tube to another!

Plans are developing for the zoological exhibitions needed in our new galleries, namely the ones vacated by Art & Craft in the redevelopment connected with moving to the Inveresk Railyards. These are early days, however, and we are a long way from finalising anything.

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TMAG

Roger Buttermore has just returned from several weeks in Europe where he spent time in Zurich and The Netherlands (see note elsewhere in this issue) researching the pollination and artificial insemination of bumblebees. We welcome Kaye Hergstrom to the TMAG as research officer for Roger's grant from the Horticultural Research & Development Corporation.

It has been a squiddy time for the TMAG in recent months. Through the efforts of zoology curator, David Pemberton, we have acquired two specimens of the giant squid *Architeuthis*, and a giant 'calamary', *Taningia* (*danae*?). All specimens were collected in a frozen state from the Petuna Seafood processing plant at Devonport, and contributed to interesting journeys back to Hobart. The largest *Architeuthis* (over 250 kilos), although frozen in a block, partially thawed on the Midlands Highway. We had to drive all through Hobart's northern roads in traffic rush-hour, wafting extremely smelly marine odours behind, while a steady rain of squiddy droplets fell on the cars following us.

One of the *Architeuthis* specimens, and the *Taningia*, were put on public display for about six hours. In that time over 4000 visitors came to see the squids, which was wonderful, but exhausting, for zoology staff, who answered visitors' questions for so long. An article about giant squid in Tasmanian waters will hopefully appear in the next issue of *Invertebrata*.

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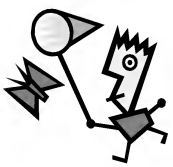

Coming to Tasmania for a quick sweep?

A notice of your planned collecting trip in *Invertebrata* will put you in touch with local experts, enthusiasts and volunteer helpers. Local zoologists would also be interested to hear where you went and what you found!

To Sweden with the BBC

Last year a group of students at Marist Regional College defined favourable *vs.* unfavourable habitat for the Burnie Burrowing Crayfish, *Engaeus yabbimunna*, along Shorewell Creek in Burnie. They published their findings on the Web:

www.mrc.tas.edu.au/bbc/index.html.

One of the students, Jonathan Duniam, entered his water quality investigation in the competition for the Stockholm Junior Water Prize. He topped the national selection in Adelaide in April and travelled to Sweden in August for the final judging. Duniam's project was one of 13 international entries. The prizewinning study, from Spain, was an evaluation of echinoderms as biological indicators of sea water quality.

The Stockholm Junior Water Prize competition is organised by the Stockholm International Water Institute. See:

www.siwi.org/sjwp/sjwp.html.

For more information on the Marist entry, *Habitat Assessment for the Burnie Burrowing Crayfish* (Engaeus yabbimunna) *on Shorewell Creek, Burnie, Tasmania*, contact Ann Burke (teacher):

aburke@start.com.au.

Historical footnote

English zoologist Geoffrey Smith spent the summer of 1907-08 in Tasmania. He was particularly interested in freshwater Crustacea, and he discovered and described the Great Lake syncarid *Paranaspides lacustris*. The following quotes are from his 1909 book *A Naturalist in Tasmania*, published by the Clarendon Press at Oxford:

The abnormal size of the Brown Trout in the Great Lake would naturally arouse the curiosity of a naturalist to inquire into any peculiar conditions of the lake which might favour their growth, and I am certainly disposed to find an answer to this problem in the extraordinary richness of the invertebrate fauna of the lake, which is quite unlike anything we are accustomed to find in the lakes of northern Europe. (pp. 78-79)

*Of other invertebrata inhabiting the Great Lake, perhaps the most conspicuous is a large freshwater Limpet (*Ancylus*) sometimes measuring an inch or more across, which is found sticking to rocks below the water mark, while under the stones a great quantity of dark olive Flat-worms and a brown Leech (*Glossiphonia*), which from its affinities is probably a fish parasite, are found. Very little is at present known about the freshwater worms of Tasmania, but a Sydney naturalist, Mr. Goddard, with whom I made several expeditions, is studying this subject, which is of great importance in connexion with the probable derivation of the fauna in the southern hemisphere.* (pp. 82-83).

The thrips of Australia… and Tasmania!

Few North Americans who have not visited this continent can credit that the distance from Brisbane to Perth is scarcely less than the distance from New York to Los Angeles. But even more impressive is the 'distance' between the flora and fauna of Tasmania and that of Australia's Top End. I am slowly compiling an introduction to the Australian insects known as thrips or Thysanoptera, and distance and diversity dominate the project. Over 550 species are listed from Australia, of which I can now recognise about 450. Most of the unknowns were named by A.A. Girault from around Brisbane, each represented by a single crushed specimen that is difficult to relate to any living insect! The real thrips fauna of Australia is well over 1000 species, judging from the many undescribed species I have prepared on microscope slides at CSIRO Entomology in Canberra.

Collecting new species is easy. The problem is to find out what each one does, its function within Australian biodiversity, and thus make it worth naming. With colleagues at Flinders University we are developing an understanding of the thrips fauna of the arid zone. In particular, we have been studying the evolution of sociality amongst the many thrips associated with wattles and she-oaks. On these plants, thrips have evolved a wide range of bizarre structures and complex biologies that we are gradually evaluating and describing. With colleagues in NAQS and DPI in Darwin we are slowly getting some idea of the many Indonesian elements in the northern fauna. But that leaves largely unknown the thrips faunas of Australia's cooler, moist zones, particularly along the east coast and in Tasmania.

One problem is that entomologists have usually sampled thrips in areas dominated by European crops and weeds, and as Lionel Hill showed with a survey of fennel, most thrips in such areas are also from Europe. Indeed, apart from the plague thrips, more than 95% of the specimens I have seen from Tasmania are of European species, and of the 25 thrips species recorded from Tasmania more than half are introductions.

Two brief visits in recent years to Margaret Williams in Hobart have convinced me of the existence of a native Tasmanian thrips fauna, but these small insects are usually impossible to collect from wet vegetation – a serious constraint! Therefore, if any reader happens to be enjoying a warm sunny day whilst amongst Tasmanian native vegetation, the possibility of finding novel thrips might interest you. A plastic BBQ tray is perfect to catch thrips beaten from plants, and a wet grass stem can be used to pick the thrips into a small vial of alcohol. Establishing the biology of thrips species is often difficult, and in cool temperate areas dominated by univoltine species, needle hunting in haystacks may seem more profitable. But with new species to be found, you could earn your name a place in Tasmanian biology!

What plants might yield useful specimens? To start with, *Nothofagus*. Any small yellowish thrips from very young *Nothofagus* leaves might provide an interesting link to the New Zealand fauna, as could larger black thrips feeding on fungus on dead twigs or branches of these southern beech trees. Small pale thrips on the youngest fronds of *Dicksonia* and *Pteridium*, just emerged from the crozier, would also be interesting. I have found a species on *Dicksonia* on older fronds bearing fresh sori, but only near Canberra. Native pea-flowers have an interesting fauna of (usually) host-specific thrips species. And for the masochists amongst you, there is an undescribed genus and species of slender yellow thrips that seems to be associated with the young leaves of cutting-grass, *Gahnia*. I would be happy to name this genus and species after any intrepid soul who secures a nice series with both sexes and preferably larvae!

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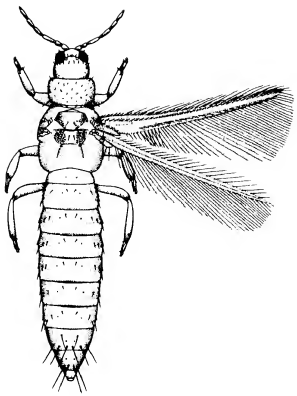
Smithers, C.N., Palma, R.L., Barker, S.C. & Mound, L.A. 1996. *Zoological Catalogue of Australia. Volume 26. Psocoptera, Phthiraptera, Thysanoptera*. Canberra: CSIRO Publishing & Australian Biological Resources Study.



Thrips australis, length 1.7 mm. Drawing by B. Rankin from CSIRO's *Insects of Australia*, p. 514.

Another Spider Crab stranding

Dozens of *Leptomithrax gaimardii* washed up May 27, 1999 on Bellerive Beach on the eastern shore of the Derwent River. Both males and females were stranded, moulting or about to moult. Their carapaces were thoroughly encrusted with the slender purple cases of tubeworms. Most were alive but the crabs were being eaten by hordes of gulls so I don't know if they were all alive when washed up. I notified Liz Turner at the Museum who organised collection and could provide readers with more details. She told me it was the first stranding recorded in the Derwent since 1953. A few carapaces washed up in early July, but were not encrusted with tubeworms.

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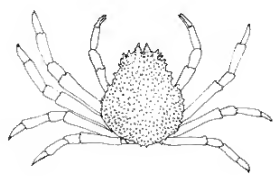
[*See* Invertebrata 14 *for more on the biology of* L. gaimardii. *- Ed.*]



Linking collection databases
↕ ↕
collection databases

The National Office for Animal and Plant Health (part of Agriculture, Forestry and Fisheries, Australia or AFFA) convened a meeting of state agricultural entomologists and plant pathologists in Canberra in July. Participants discussed proposals to seek funds from agricultural research and development corporations to enable state collection databases to be linked.

Technology developed by CSIRO's Mathematics and Computing Sciences group was recently used to link several CSIRO biological collection databases. It is based on North American experience in linking databases with diverse designs. In this system, 'gateways' are placed at each database as intermediaries. They extract data and forward it in XM Language via the Internet to a 'broker'. The 'broker' collates results from several 'gateways' and forwards it to an approved client who gets data simultaneously from several sources following a single request.

Most organisational people love this concept because it avoids the difficulties of establishing a common software, let alone a common structure, for databases. In a sense, the system exploits the lowest common denominator among diverse databases. Agricultural entomologists and ANIC hope to obtain funds to enable approved users to simultaneously query their databases via the Internet and receive collated results as if connected to a single database. The saving in time would be substantial. It recently took 18 months to collate a list of tomato pests needed to support an export opportunity.

Forestry and some state agricultural collections have been excluded from the initial application for funds because it is seen as a pilot scheme. More unfortunately, to my mind, the museum scene was ignored and there are no procedures for subsequent collaboration. The national botanical database got more exposure at the meeting than activity in museum invertebrate collections. The only link to the museum world was the presence of Ebbe Nielsen and the BioLink team who demonstrated their new relational database package.

What has happened reflects a lack of vision and mutual awareness in agricultural and museum collections - awareness of activities in each other's sphere and of developments in other countries. Nevertheless, the recently completed CSIRO-ANIC database of 15000 records on heliothinine moths (including major pests of plants) obtained half its distributional records from labels in museum collections rather than state agricultural collections or the ANIC. I might add that no one thought to seek data from Tasmania, yet we have several hundred records already digitised.

The relevance of data not linked to a specimen, such as data held by diagnostic laboratories and records published in the 20-volume *Insect Pest Survey of Tasmania*, which covers 1967-87, was not seriously considered. Many fungal and insect collection curators seem to think that non-specimen data is irrelevant to a system of 'pest records' for Australia. *'If there isn't a specimen, then it doesn't exist.'* Some may have thought the deficiency could be addressed later, by someone else. However, our trading partners scrutinise all sources of pest records and are not impressed by lists that appear too short.

The seemingly hasty pilot scheme reflects the frustration that has accumulated over two decades in the committee advising the peak forum for agricultural ministers to obtain backing for a well-funded national network of collections. Players at the July meeting were anxious to formulate a small project proposal to agricultural research and development corporations rather than address all the issues - an insular nibble rather than a holistic bite.

The standard of documentation for 'pest records' required to defend quarantine barriers and access new markets in GATT and related agreements has risen to a level where some entomologists see an opportunity to get their specimen catalogues funded. However, I remain disappointed at the level of insularity and ignorance concerning bioinformatics among the majority of managers of agricultural fungal and insect collection around Australia.

In preparation for the workshop I wrote an overview of Tasmanian collections and databases in a broad context. Unfortunately it could not be presented at the meeting because the agenda was foreshortened. I thank those who supplied information to me and am happy to post a copy of the paper on request.

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Bumblebee update

Roger Buttermore, Senior Invertebrate Zoology Curator at the Tasmanian Museum and Art Gallery, is Chief Investigator of Horticultural Research & Development Corporation (HRDC) Project Number VG99033, *Environmental research on the impact of bumblebees in Australia and facilitation of national communication for or against further introductions.*

As part of the grant from HRDC for bumblebee research, Roger attended a specialists' meeting on insect pollination in greenhouses held in Soesterberg, The Netherlands, from 30th September to 2nd October. He presented a paper entitled *Further developments concerning rearing (inbred) Tasmanian bumblebees.*

Before attending the meeting he visited the research labs of ETH, Zurich, where he spent three days with Dr B. Baer observing artificial insemination techniques and other research on bumblebees. He also gave a seminar to ETH staff on current bumblebee research in Tasmania.

Kaye Hergstsrom began as research officer for the HRDC project in September. She has previously worked on pollination studies for Dr Derek Maelzer and Prof Robin Thorpe (UC Davis). Since completing a Masters degree in 1986, Kaye has been refining her monitoring skills on tree, vegetable and vine crops in Victoria and Darwin, and has sharpened her administrative skills working on Ecologically Sustainable Development in the Victorian Department of Premier and Cabinet.

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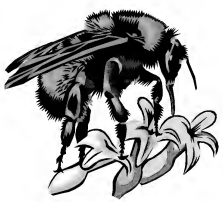
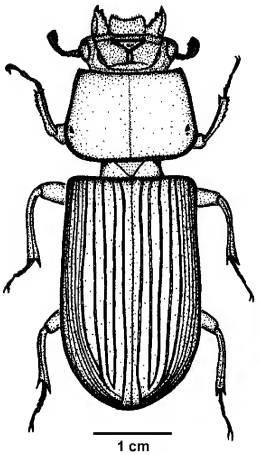


The hidden world of passalid beetles

The human observer, aware of the diversity of life, sees trees and shrubs, ferns and mosses, fruiting fungi in numerous forms, birds and insects of all kinds, spiders and crustaceans, and so on. However, even the keenest eye often misses a significant portion of the life that surrounds us: the incredible 'hidden biodiversity' of symbiotic organisms. Indeed, if every metazoan has a symbiotic species specific to it (e.g. a species of protozoan or nematode), estimates of global biodiversity could be doubled (May 1994). A spectacular example of this hidden biodiversity is the passalid beetle (Coleoptera: Passalidae).

Passalid beetles are not obvious. These creatures spend most of their lives tunneling in rotting timber, leaving only to colonise new logs. The adult beetle is quite attractive, most species being 25-50 mm long, glossy black (teneral adults are tan-coloured), and have elytra with numerous longitudinal grooves (see illustration). Over 500 species have been described, primarily from the world's wet tropics. Australia has about 35 described species, mostly from the east coast of Queensland; and only one species, *Pharochilus politus* (illustrated), is known from Tasmania. Sadly, the state of our understanding of Australian passalid beetles is atrocious. Little taxonomic work has been done (Dibb 1938), and we are shamed by the amount of work currently being carried out on passalid beetles in Japan and the Americas.

The life histories, at least of the American species, are fascinating. Passalid beetles are among the most social insects outside of the Hymenoptera and Isoptera. One beetle (of either sex) arrives at a log and begins tunneling; another beetle that will complete the pair arrives later. The paired beetles defend the tunnel from other passalid intruders, and are monogamous for at least the duration of development of their first brood. The larvae are unable to feed directly from wood, their main food source being a combination of adult faeces and powdered wood fragments, suggesting a gut-flora exchange (Valenzuela-G. 1993). Metamorphosis takes place within a pupal chamber constructed by conspecific beetles, usually the parents or their offspring. Passalid larvae and adults communicate with sound signals. Larvae make sounds by rubbing their highly reduced third pair of legs against a file on the mid-coxa. Adults make a sound by rubbing a plectrum on the hindwings on a *pars stridens* on the dorsal surface of the abdomen. Adult beetles give out a particularly noisy alarm call when picked up.



Another feature of passalid beetles, worldwide, is the amazing diversity of life associated with them. Twenty-five families of mites are associated with passalid beetles, living a variety of lives on the exterior of the beetle or under the beetle's wings. Some of the mites are phoretic, some are parasites, and some seem to use the beetle as a mating ground. Further, passalid beetles, and some of the mites that live on them, are host to an unusual group of parasitic fungi called the Laboulbeniales. Again, this diverse group of fungi is virtually unknown in Australia. The gut flora of passalids is also (unsurprisingly by now) diverse. A dissection of the gut will always reveal a healthy population of nematodes and numerous growths of another diverse group of fungi, the Trichomycetes.

My own work has focused on the mites and, to a lesser extent, the Laboulbeniales associated with passalids and their mites (see Weir & Bakes 1995). Should anyone find passalid beetles in Tasmania, I would be extremely interested in looking at them, either alive (make sure you put a little wood in for the beetle) or dead (killed in alcohol – most of the mites run off the beetle in a killing jar). Considering the lack of knowledge regarding the biology of Australian passalid beetles, I expect to find many new species of mites. Only one passalid-associated mite has been described from Tasmania, but I have four species in my limited collections thus far!

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More information:

Dibb, J.R. 1938. Synopsis of Australian Passalidae (Coleoptera). *Transactions of the Royal Entomological Society of London* 87: 103-124.

May, R. M. 1994. Conceptual aspects of the quantification of the extent of biological diversity. *Philosophical Transactions of the Royal Society of London B Biological Sciences* 345: 13-20.

Valenzuela-González, J. 1993. Pupal cell-building behavior in passalid beetles (Coleoptera: Passalidae). *Journal of Insect Behavior* 6: 33-41.

Weir, A. and Beakes, G. 1995. An introduction to the Laboulbeniales: a fascinating group of entomogenous fungi. *Mycologist* 9: 6-10.

Lea's Legacy

Celebrating a century of insect collecting

Lea's Legacy is a new book by Trevor Semmens detailing the history of the insect collection of the Department of Primary Industries, Water and Environment. The book was launched in Hobart on 21st September, in Adelaide on the 23rd and at the Australian Entomological Society conference in Canberra on the 29th.

Lea's Legacy includes notes on principal personages connected with the collection and a list of publications by DPIWE entomology staff. The book has 64 A4 pages in soft cover.

Copies are available for $15 each plus $2.50 per copy for postage and handling. Order from Helen Measham, DPIWE, GPO Box 44A, Hobart TAS 7001. For further information, contact Trevor Semmens on (03) 6233 6834.

A new subfamily of tineid moth recorded in Tasmania

Tineids are a cosmopolitan group of rather primitive, small moths which include the familiar clothes moths but many others besides. Their larvae are typically detritivores, with various species feeding on leaf litter, decaying wood, fungi, dry carcasses and feathers. *Micrerethista nigrapex*, recently described by Don Davis of the Smithsonian Institution, is a noteworthy addition to the small Tasmanian fauna of tineid moths. It is in the subfamily Harmacloninae, a pantropical subfamily of two genera, with larvae probably boring in woody tissue.

The genus *Micrerethista* Davis includes four uncommon Australian species which are found along the east coast to Darwin. The adult moths possess what appear to be functional tympana (hearing organs) which may represent one of the earliest adaptations in the Lepidoptera to bat sonar. *Micrerethista nigrapex* Davis, 1998 is a narrow-winged, grey species sparingly distributed from southern Queensland to Tasmania, generally near the coast. The only known Tasmanian specimen was collected a decade ago at a mercury vapour light in *Eucalyptus pulchella-E. ovata* open forest on Mount Nelson, 200m a.s.l., about 3km SSW of Hobart.

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More information:

Davis, D.R. 1998. A world classification of the Harmacloninae, a new subfamily of the Tineidae (Lepidoptera: Tineidae). *Smithsonian Contributions to Zoology No. 597*; 81pp.

Digital goodies

Two years ago (*Invertebrata* 9) I explained how to set up a video microscope for less than $1000. The camera used was a black-and-white 'security' model with a nominal 800x600 pixel image. I looked forward at the time to seeing good-resolution colour CCD minicams selling for less than $500 in 1998. This month you can buy a Compro PS39 digital video camera from computer shops for $339. It plugs in to your PC with a USB connection and takes 1280x960 still pictures in 24-bit ('true') colour, or 40 fps video. It works in low light and the adjustable focus lens is claimed to work well from 10mm to infinity.

Which search engine do you use? One of the name brands? A meta-engine, like Metacrawler? I suggest you visit Google at www.google.com. Google's speed and Net coverage are extraordinary, and the follow-on feature 'GoogleScout' takes you to related documents like a helpful librarian in a paper-based archive. Definitely worth a trial, and it's free.

Ed.

News from the Mole Creek caves

I was in Tassie last summer, doing a cave fauna survey and management plan for Mole Creek karst for the Tasmanian Parks & Wildlife Service. This involved, amongst other things, assessing the conservation status of three listed cave invertebrates endemic to the Mole Creek karst: Mole Creek cave harvestman (*Hickmanoxyomma gibbergunyar*), Mole Creek cave beetle (*Tasmanotrechus cockerilli*) and Mole Creek cave pseudoscorpion (*Pseudotyrannochthonius typhlus*).

The three species were recorded from a number of new cave localities within the Mole Creek karst, including caves within the World Heritage Area. *T. cockerilli* is recommended for downlisting from 'vulnerable' to 'rare'. The other two remain listed as 'rare'.

Mark Harvey at the Western Australian Museum has examined new and previous collections of pseudoscorpion material and compared this with Alan Dartnall's type specimens. Mark has concluded that all the material, collected from a number of different cave systems within the Mole Creek karst, belongs to the same species, *P. typhlus*. This finding is good news for conservation of the taxon since a number of the cave systems within the Mole Creek karst are subject to potentially threatening processes associated with land use practices.

Many thanks to Tammy Gordon (QVMAG) and Liz Turner (TMAG) for the prompt dispatch of specimens. The material collected during the Mole Creek survey has been lodged at QVMAG.

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Wanted! Wanted! Wanted!

Reports of 'people news' and invertebrate goings-on from DPIWE, Inland Fisheries Commission, CSIRO Marine Labs, University of Tasmania departments and any other agencies, institutions or individuals studying invertebrates in Tasmania. We and our readers are especially keen to hear from non-professional zoologists with tales and tidbits about this State's wonderful invertebrate fauna. Pictures are very welcome, both to illustrate animals under discussion and to make *Invertebrata* look more interesting. Contributed pictures should be black-and-white line illustrations, not in colour and not in a range of grays. Please send these as hard copy, as scanned bitmaps on diskette, or as JPEG files by e-mail.

Notices & reviews

The Other 99%. The Conservation and Biodiversity of Invertebrates. 1999. W. Ponder & D. Lunney, eds. Mosman (NSW): The Royal Zoological Society of New South Wales. 462 pp. ISBN 0 9586085 1 2. Price $90.

'The proceedings of *The Other 99%* conference held at the Australian Museum in Sydney on 9-12 December 1997 were published in June 1999. The conference drew a mix of scientists, science reporters and students who presented papers and posters regarding invertebrate diversity and conservation issues.

'The proceedings volume of *The Other 99%* is split into four main theme areas: assessing invertebrate biodiversity; importance of invertebrate biodiversity; conservation and endangered species; and communicating invertebrate issues to the public and media. Each of these themes is based on the conference symposia and includes actual case studies.

'Summaries of the outcomes of two workshops held in conjunction with the conference are included in the volume. One of these examines the ways in which conservationists and land managers can use invertebrate data to manage Australia's biodiversity, the other assesses criteria for conserving invertebrates.

'The proceedings have been published by The Royal Zoological Society of New South Wales and are available from:

'Surrey Beatty & Sons, 43 Rickard Road, Chipping Norton NSW 2130
ph (02) 9602 3888, fax (02) 9821 1253, surreybeatty@iform.com.au.'

Editor's note:

I recommend this book very highly to Invertebrata *readers concerned about conserving Australian invertebrates. The two earlier volumes from conferences in this series (Brisbane 1993, Melbourne 1995) were valuable chiefly for their papers presenting original research results.* The Other 99% *includes a wealth of report and opinion on how what we've learned about invertebrates should be applied to their conservation.*

Tasmanian results feature in 11 of the 72 articles:

Life history diversity and molecular phylogeny in the Australian seastar genus *Patiriella*. *M. Byrne, A. Cerra, M. Hart & M. Smith*

The biology of *Hickmania troglodytes*, the Tasmanian Cave Spider. *N.E. Doran, A.M.M. Richardson & R. Swain*

Management of threatened invertebrates of the Tasmanian Wilderness World Heritage Area. *M.M. Driessen*

Taxonomic and life history notes on Australian *Nousia* and *Koorrnonga* (Ephemeroptera: Leptophlebiidae). *K.J. Finlay*

The effect of fire on epigaeic arthropods in Buttongrass moorland in Tasmania. *P. Greenslade & M. Driessen*

The epigaeic arthropod fauna of Buttongrass moorland in Tasmanian Wilderness World Heritage Area. *P. Greenslade & D. Smith*

Interpreting the geographic range, habitat and evolution of the Tasmanian freshwater crayfish genus *Parastacoides* from a museum collection. *B. Hansen & A.M.M. Richardson*

The effect of changes in Tasmanian grasslands on the geometrid moth tribe Xanthorhoini (Geometridae: Larentiinae). *P.B. McQuillan*

The Mersey Break: an unexplained faunal boundary on the north coast of Tasmania. *R. Mesibov*

Carabid beetle (Coleoptera: Carabidae) communities in Tasmania: classification for nature conservation. *K. Michaels*

The distribution of strandline fauna of sandy beaches on the east coast of Tasmania. *A.M.M. Richardson, C.J. Shepherd & R. Swain*

Code 4th Edition

The new and considerably revised Fourth Edition of the International Code of Zoological Nomenclature has just been published by the International Commission on Zoological Nomenclature (ICZN). The price of the 4th Edition is £40 or US$65. The following discounts are offered:

- Individual members of a scientific society ordering one copy for personal use are offered a discount of 25% (price £30 or US$48); the name and address of the society should be given.
- Individual members of the American or European Associations for Zoological Nomenclature ordering one copy for personal use are offered a discount of 40% (price £24 or US$39).
- Postgraduate or undergraduate students ordering one copy for personal use are offered a discount of 25% (price £30 or US$48); the name and address of the student's supervisor should be given.
- Institutions or agents buying 5 or more copies are offered a 25% discount (price £30 or US$48 for each copy).

Prices include surface postage; for airmail outside Europe please add £2 or US$3 per copy.

Copies may be ordered from:

ITZN, c/o The Natural History Museum, Cromwell Road, London SW7 5BD, U.K. (e-mail: iczn@nhm.ac.uk), or

AAZN, Attn. D.G. Smith, MRC-159, National Museum of Natural History, Washington, D.C. 20560-0159, U.S.A. (e-mail: smithd@nmnh.si.edu)

Payment should accompany orders. Cheques should be made out to "ITZN" (sterling or dollars) or to "AAZN" (dollars only). Payment to ITZN (but not to AAZN) can also be made by credit card (Visa or MasterCard only) giving the cardholder's number, name and address and the expiry date.

Individual purchasers of the Code are offered a 50% discount on one copy of the following publications for personal use:

- *The Official Lists and Indexes of Names and Works in Zoology* (1987) - reduced from £60 to £30 and from US$110 to US $55;
- *Towards Stability in the Names of Animals - a History of the International Commission on Zoological Nomenclature 1895-1995* (1995) - reduced from £30 to £15 and from US$50 to US$25:
- *The Bulletin of Zoological Nomenclature* (the Commission's quarterly journal) - discount valid for up to 5 years; for 1999 the discounted price would be £51 or US $90.

For more information, visit the ICZN Website: **www.iczn.org**.

Invertebrates in the media

'Plague' of snails, slugs squelching across N W farms

The Advocate newspaper, 13 October 1999 (online edition)

TASMANIAN crops are being threatened by an 'epidemic' of snails and slugs.

The agricultural industry has been seriously affected by the pests and many crops have had to be resown, according to Gawler farmer Graham McKenna.

'You generally get about one year in several, and it seems that this is that year,' he said. 'But this is the worst year that I have ever experienced.'

Mr McKenna said his crop had not been seriously affected because he took precautionary measures very early in the season.

'We lay a trail of snail bait around the perimeter of the crop that usually keeps them out,' he said.

Mr McKenna said the snail problem could be expensive if farmers were late in laying snail bait.

'If they get severe and get into the crop, we have to spread the bait across the entire paddock,' he said.

This year farmers have experienced further problems in availability of snail bait because it is in such high demand.

Bags of snail bait range in price from $60 to $150 and if constant resowing is needed, the defence becomes very expensive.

'Most of it just washes away after a couple of rains anyway,' he said.

Tasmanian Alkaloids field operations manager Rick Rockliff said that for the poppy industry, the main threat had been from slugs.

'After the very dry winter, and with the bit of rain that we had a few months ago, they seem to breed very rapidly and cause these problems,' Mr Rockliff said.

'The problems mainly occur in young crops.' Mr Rockliff said the snail problem was best attacked by the farmers very early in the season.

'They (snails) are not hard to control - it is just that some farmers have left it too late,' he said.

* * *

Invertebrata contacted Tasmanian Alkaloids and Serve-Ag for more information. The slug attacking poppies is *Deroceras reticulatum*, aka 'The Grey Garden Slug', a long-naturalised import from Europe. Slugs have been a problem this Spring from Circular Head east to Scottsdale along the north coast. The south of the State has apparently been too dry for slugs to breed up to troublesome levels. Control consists of broadcast spreading of 'snail bait' at 15 kg/ha from 25 kg bags. In some areas, several spreadings have been needed to achieve effective kills.

The active ingredient in the 'snail bait' most commonly used in Tasmania is metaldehyde, which chemically speaking is 2,4,6,8-tetramethyl-1,3,5,7,-tetraoxy-cyclooctane. It's the world's most popular molluscicide, and is sold under a long list of product names. In Tasmania, gardeners buy 'Defender' and farmers buy 'Meta'.

I've seen two accounts of how the snail-killing properties of metaldehyde were discovered. To be patriotic, I'll give the Tasmanian story first:

Les Vaughan and his two brothers left Tasmania in 1937 and opened a produce store near Sydney. One day, when Les delivered some goods to another shop-keeper, he noticed that some half-burnt packets had blown from the latter's incinerator and lay on the ground with a number of dead snails and slugs lying around them. He found that the packets had contained metaldehyde, used by doctors to sterilise hypodermic needles.

Once at home, he mixed metaldehyde with very fine bran, coloured it green, and made up hundreds of packets with instructions as to its use. He and his family then put the sample in letter boxes in Sydney's North Shore. The product was an immediate success, with gardeners constantly coming into the shop demanding more snail killer. By 1977, 2000 tonnes of Defender were being produced annually. (Cassidy & Wishart 1987, p. 51)

Dr Bill Symondson of the University of Wales, Cardiff, has a different idea:

Originally metaldehyde was used as a solid fuel (meta-tablets). Its slug-killing properties were accidentally discovered by farmers in southern France who noticed dead and dying slugs and snails on picnic sites where meta-tablets had been left on the ground.

Symondson goes on to explain how metaldehyde works (and sometimes doesn't):

A Metaldedyde slug pellet contains only about 4 per cent of this chemical, the rest is in fact bait, containing a cereal base with various added attractants, such as yeast. Pure metaldehyde actually repels slugs, as will concentrations of pellets, which explains why it is important to spread these thinly. The poison can affect slugs either by contact, with absorption through the skin, or through the gut when eaten. The main effect is that of an irritant, causing the slug to produce masses of mucus, leading to dehydration and sometimes death. Loss of mucus also means, that the slug can no longer move around, so that dead and dying slugs are found close to the baiting site.

Unfortunately, this dehydration process can take a day or more to kill the slug. If, during this interval, there is rain, or even a heavy dew, slugs can rehydrate and make a full recovery. Temperature is also very important. At 44 degrees F (7 degrees C) or below, treatment is likely to fail, particularly in damp conditions. Above 68 degrees F (20 degrees C) a very high percentage of slugs will be killed. There is clearly a 'Catch-22' situation here, for in hot dry weather when the kill rate is highest, slug activity is lowest, whereas in damp conditions, when slug activity is highest kill rates are lowest, because there is a high recovery rate! (www.oxalis.co.uk/slug.htm)

Non-Tasmanian readers may be surprised to hear that this State grows opium poppies. In round figures, Tasmania accounts for 40% of 'legal' world production of opiate alkaloids. The farm gate value is AUD$30 million and some growers earn $6000/ha. Poppy growing in Tasmania is tightly controlled by international agreements, but slugs are ignorant of the law and nibble the plants whenever they like.

More information:

Cassidy, J. and Wishart, E. 1987. *Tasmanian Inventions and Innovations.* Launceston: Queen Victoria Museum and Art Gallery.

Kershaw, R.C. 1991. *Snails and Slugs Introduced to or Pests in Tasmania.* Launceston: Queen Victoria Museum and Art Gallery.